

REMARKS

The present amendment and remarks are in response to the Office Action mailed April 08, 2004. Claim 13 has been amended. Claims 13-16 are currently pending.

Reconsideration of the application is respectfully requested in view of the following responsive remarks. For the Examiner's convenience and reference, the Applicant's remarks are presented in the order in which the corresponding issues were raised in the Office Action.

In the Office Action, the following rejections were made:

- (1) claims 13-16 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite,
- (2) claims 13-16 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 6,001,947 (hereinafter "Brunnemann");
- (3) claims 13-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Brunnemann;
- (4) claims 13-16 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,707,543 (hereinafter "Akashi");
- (5) claims 13-16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Akashi;
- (6) claims 13 and 16 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 6,057,384 (hereinafter "Nguyen");
- (7) claims 13 and 16 were rejected under 35 U.S.C. 103(a) as being unpatentable over Nguyen.

Rejections under 35 U.S.C. 112

The Examiner has rejected claims 13-16 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Applicant has amended independent claim 13 to state that the components are combined to form an amphipathic copolymer as described in the specification on pages 7-9. Accordingly, the Applicant respectfully requests withdrawal of this rejection.

Rejections under 102 and 103

Before discussing the 102 and 103 rejections herein, it is thought proper to briefly state what is required to sustain such rejections. In order for an Examiner to establish that a claim within a patent application has been anticipated under 35 U.S.C. 102, the Examiner must provide a reference teaching that which is claimed. Accordingly, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987). Thus, the Examiner must show that each and every element of the instant claims is taught by a single prior art reference. The Applicants respectfully contend that the Examiner has not provided a single reference that teaches each and every element of the instant claims in any of the rejections.

The issue under 35 U.S.C. 103 is whether the PTO has stated a case of *prima facie* obviousness. According to the MPEP § 2142, the Examiner has the burden and must establish a case of *prima facie* obviousness by showing some motivation in a prior art reference to modify that reference, or combine that reference with multiple references, to teach all the claim limitations in the instant application.

The Applicants respectfully assert the Examiner has not satisfied the requirement for establishing a case of *prima facie* obviousness in these rejections.

Rejections under Brunnemann

The Examiner has rejected claims 13-16 under 35 U.S.C. 102(b) as being anticipated by Brunnemann. Brunnemann teaches coating compositions containing polyacrylate resins for automobile finishes. The polyacrylate resin compositions comprise at least one carboxyl-containing monomer and at least one aromatic vinyl compound (abstract). The resin contains either 5 or 7 components (a1, a2, a3, a4, a5, a6, a7), where a4 and a7 are optional (col. 9, ln. 17-36). These components are taught to be included in the resin at specific weight percents such as: a1 from 5 to 74%, a2 from 10 to 40%, a3 from 10 to 50%, a4 from 0 to 10%, a5 less than 5%, a6 from 5 to 40%, and a7 from 0 to 40% (col. 9, ln. 17-36). The resin is synthesized in an organic solvent via radical polymerization with initiators that form free radicals, such as t-butyl perethylhexanoate, benzoyl peroxide, azobisisobutyronitrile, and t-butyl perbenzoate (col. 9, ln. 45 to col. 10, ln. 2). The resin can be combined with a cross linker in the composition, where the isocyanate groups of the cross linker to hydroxyl groups of component (A) ranges from 1:3 to 3:1 (col. 11, ln. 27-30). Additionally, the particle size of the resin is taught to be less than 10 micrometers, but only after grinding (col. 16, ln. 15-30).

Brunnemann neither teaches atomic transfer radical polymerization (ATRP), nor that the ATRP process can be utilized to control the identity, length, weight of the resultant copolymer by slow growth polymerization. Additionally, Brunnemann does not teach the resultant polymers to have a polydispersity index in the range of 1-1.2.

Further, Brunnemann does not teach amphipathic copolymer particles that have a size range of 50-500 nm.

This concept of polydispersity is significant to the claimed invention. In organic chemistry, the polydispersity index, or PDI, is a measure of the distribution of molecular weights in a given polymer sample. The PDI is calculated as the weight-average molecular weight divided by the number average molecular weight. As the polymer chains approach uniform chain length, the PDI approaches unity (or 1). Typical PDI values vary based on the mechanism of polymerization and can be affected by a variety of reaction conditions. For typical addition polymerization, values of the PDI can typically range around 10 to 20. For typical step polymerization, values range around 2 to 3. The particles of the present invention have a polydispersity that is more uniform than either of these known methods.

A comparison of the instantly claimed invention with the Brunnemann reference shows that a number of the claim limitations are not taught in Brunnemann. First, Brunnemann does not teach polymerization by the ATRP process. This is significant because the instant invention teaches that this process enables the ability to more carefully control polymerization compared to typical radical polymerization reaction processes, such as those described in Brunneman. As a result of using ATRP, the resultant claimed amphipathic polymers having a polydispersity index in the range of 1-1.2 can be formed. Brunnemann does not teach that the resins described therein can have a polydispersity index that falls within the narrow range of 1-1.2, i.e. approaching unity. Further, Brunnemann does not teach that the polymerization can control the identity of the polymeric resins. As identity is not controlled in Brunnemann to the extent possible through the ATRP process, the present claimed particulates must inherently have an identity that is not

taught by Brunnemann. Distinguishing Brunnemann further, this reference exemplifies its particles as having a size of less than 10 micrometers after grinding. On the other hand, the instantly claimed invention includes the limitation that the amphiphatic copolymer particles have a size range from 50-500 nm. Though a size of less than 10 micrometers would include the size range of 50 to 500 nm, the size of 10 micrometers is more than a full order of magnitude larger than the upper range of the presently claimed particles. Thus, a teaching of less than 10 micrometers would not lead one skilled in the art to the relatively narrow size range of the present claims, particularly since this narrower size range is at least a full order of magnitude lower.

In accordance with the above comparison of the prior art with the Applicant's instantly claimed invention, at least one claim limitation is not taught by the Brunnemann reference. Thus, the Brunnemann reference cannot anticipate the instantly claimed invention, and withdrawal of this anticipatory rejection is respectfully requested.

The Examiner has also rejected claims 13-16 under 35 U.S.C. 103(a) as being unpatentable over Brunnemann. However, the Examiner did not provide any reasons separate from the reasons given for the anticipation rejection as to why the claims were rejected as an obvious modification of Brunnemann. Claim 13 describes the amphiphatic copolymer particle as having a size range from 50-500 nm, and a polydispersity index in the range of 1-1.2. There is not a single instance in Brunnemann that suggests synthesis of its resins via an ATRP process to obtain amphiphatic copolymers having a size range of 50-500 nm and a polydispersity index in the range of 1-1.2. Since there is no suggestion in Brunnemann to modify its resins or the synthesis thereof to arrive at the instantly claimed invention, the

reference itself does not provide for any motivation for the proposed modification. Thus, the Examiner has not established a case of *prima facie* obviousness and withdrawal of the obviousness rejection is respectfully requested.

Rejections under Akashi

The Examiner has rejected claims 13-16 under 35 U.S.C. 102(b) as being anticipated by Akashi. Akashi discloses a high molecular weight polymer comprising a liquid crystal monomer and a non-liquid crystal monomer (abstract). The non-liquid crystal monomers have hydrophobic moieties (col. 4, ln. 4-67) and the non-liquid crystal monomers have moieties with hydrogen atoms used for forming hydrogen bonds (col. 5, ln. 4-50). Akashi teaches that the polymer can be synthesized via "ordinary radical polymerization, ionic polymerization, or addition reaction" (col. 3, ln. 60-61), which can form random copolymers, graft copolymers, and alternating copolymers" (col. 5, ln. 66-667). On the other hand, Akashi does not teach anything about atomic transfer radical polymerization (ATRP), or that the ATRP process can be utilized to control the identity, length, weight of the resultant copolymer by slow growth polymerization. Specifically, Akashi is devoid of teaching that the resultant polymers can have a polydispersity index in the range of 1-1.2. Further, Akashi does not disclose amphipathic copolymer particles having a size range of 50-500 nm.

As above, the instantly claimed amphipathic copolymer particles have a size range of 50-500 nm and a polydispersity index in the range of 1-1.2. By teaching that the polymers can be synthesized by "ordinary radical polymerization, ionic polymerization, or addition reaction," Akashi is completely devoid of disclosing that the polymerization can produce amphipathic copolymer particles of the instant

invention. Additionally, Akashi never discloses anything about polymer particles having a size range of 50-500 nm and/or a polydispersity index in the range of 1-1.2. As such, a comparison of the instantly claimed invention with the Akashi reference shows that a number of the claim limitations are not taught.

Since the teachings of Akashi do not provide for each and every element of the instant claims, the reference cannot anticipate the claimed invention. Thus, the Applicant respectfully requests withdrawal of this rejection.

The Examiner has also rejected claims 13-16 under 35 U.S.C. 103(a) as being unpatentable over Akashi. As discussed above, claim 13 distinguishes the present invention as an amphipathic copolymer particle having a size range from 50-500 nm and a polydispersity index in the range of 1-1.2. As above, there is not a single teaching in Akashi to motivate the modifications thereto in order to arrive at the instant invention. Thus, the Examiner has not established a case of *prima facie* obviousness, and withdrawal of the obviousness rejection is respectfully requested.

Rejections under Nguyen

The Examiner has rejected claims 13 and 16 under 35 U.S.C. 102(b) as being anticipated by Nguyen. Nguyen teaches core/shell polymers that have hydrophilic monomers and hydrophobic monomers (col. 2 through col. 3). These particles can have an average particle size of 220 nm (example 3 in col. 27). Also, Nguyen teaches that the polymers can be synthesized by free-radical polymerization with free-radical initiators such as ammonium persulfate, potassium persulfate, hydrogen peroxide, benzoyl peroxide, and azobisisobutyronitrile (col. 8, ln. 13-24). Nguyen states that it is preferred that the resultant polymer is a random polymer (col. 8, ln. 24). On the other hand, Nguyen does not teach the use of atomic transfer radical

polymerization (ATRP) to control the identity, length, and weight of the resultant copolymer by *slow* growth polymerization. Also, Nguyen is completely devoid of teaching amphipathic copolymers having polydispersity index in the range of 1-1.2.

Again, the instant invention synthesizes amphipathic copolymers with the ATRP process to achieve a polydispersity index in the range of 1-1.2. Comparatively, the teachings of Nguyen are devoid of the ATRP process, and do not disclose the ability to obtain a polydispersity index in the range of 1-1.2. As such, the teachings of Nguyen fail to teach each and every element of the instantly claimed invention. Thus, Nguyen does not anticipate the instantly claimed invention, and withdrawal of this rejection is respectfully requested.

The Examiner has also rejected claims 13 and 16 under 35 U.S.C. 103(a) as being unpatentable over Nguyen. However, as before, the Examiner has not provided any reason to why it would be obvious to modify the teachings of Nguyen. Nguyen specifically sets forth a reaction scheme in order to synthesize the polymers, and does not ever provide any indicia to motivate the use of reaction schemes other than the free-radical polymerization with free-radical initiators as taught. From the teachings of Nguyen, one of ordinary skill in the art would not be motivated to utilize the ATRP process in order to arrive at amphipathic copolymers having a polydispersity index in the range of 1-1.2. As such, the Examiner's modification is improper, and does not provide an adequate basis for establishing a *prima facie* case of obviousness. Thus, the Applicant respectfully requests withdrawal of this rejection.

SUMMARY

In view of the foregoing, Applicant believes that claims 13-16 present allowable subject matter and allowance is respectfully requested. If any impediment to the allowance of these claims remains after consideration of the above remarks, and such impediment could be removed during a telephone interview, the Examiner is invited to telephone Susan E. Heminger at (650) 236-2738 so that such issues may be resolved as expeditiously as possible.

Please charge any additional fees except for Issue Fee or credit any overpayment to Deposit Account No. 08-2025.

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Respectfully submitted,


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